

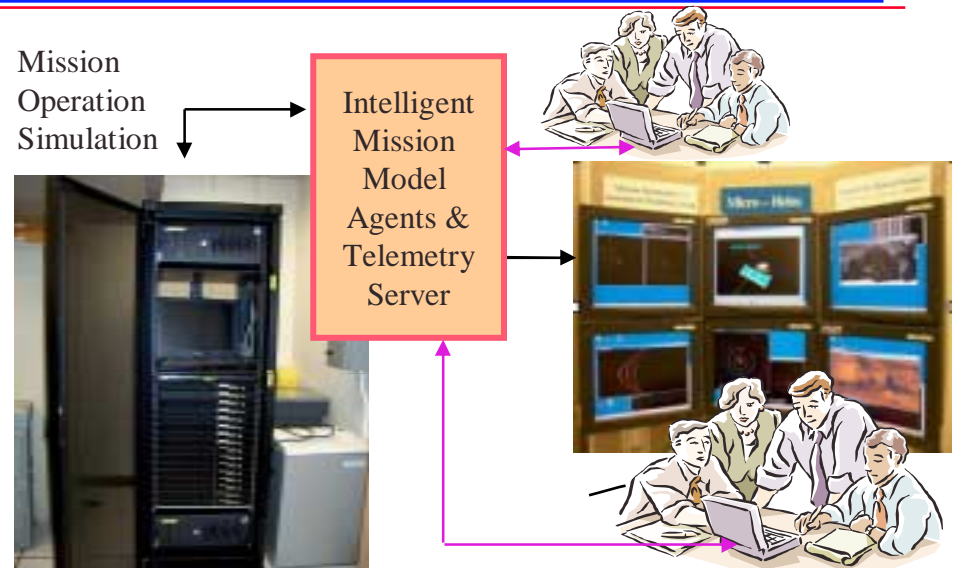


Distributed Mission Simulation

PI: Meemong Lee, JPL

Objective

- Design and Implement a distributed Virtual mission operation framework that can support collaborative science instrument and experiment scenario design among geographically distributed teams.
- The framework should facilitate configurable integration of subsystem models, model-based operation scenario analysis, and operation scenario execution in a realistic mission operation environment for science-return validation during early design phase.



Approach

- Implement a PC cluster architecture for supporting real-time mission operation simulation and simultaneous visualization of multiple subsystem states.
- Design intelligent mission model agents for accessing multi-disciplinary mission design products from a wide range of sources.
- Implement a multi-threaded inter-process communication protocol for synchronized broadcasting of mission state information to a large number of design teams.

Key Milestones

- | | |
|---|-------|
| • Intelligent Agent for project design parameter access | 6/02 |
| • Virtual Science experiment demo | 12/02 |
| • Virtual Telemetry System | 4/03 |
| • Earth Mission Study support - Science Validation | 7/03 |
| • Robust Virtual Telemetry Server/Client | 9/03 |
| • Virtual Telemetry Broadcast System | 12/03 |
| • Integrate Team-I instrument design process with the Virtual Science Experiment System | 5/04 |
| • Fully operational in Team-I supporting Earth mission study | 9/04 |

TRL_{in} = 3

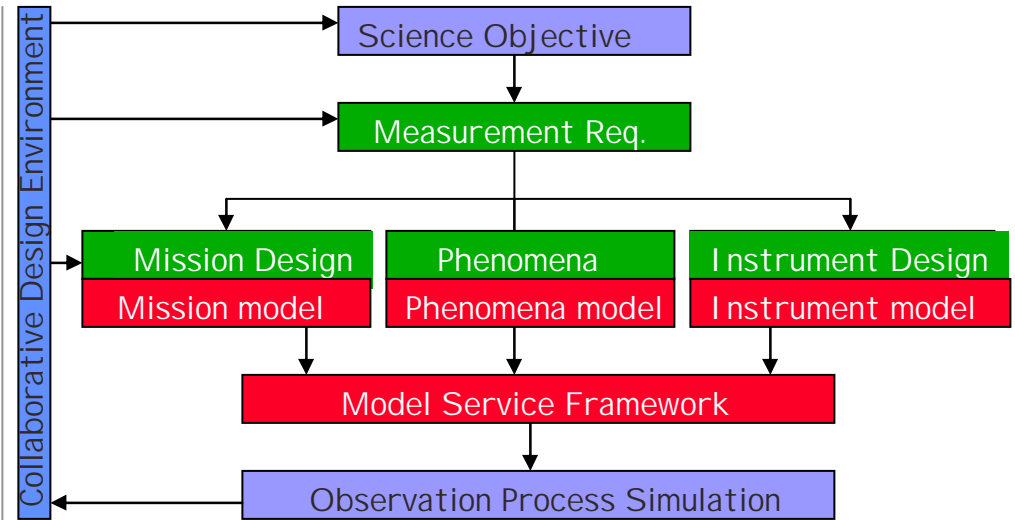


Distributed Mission Simulation

PI: Dr Meemong Lee at JPL

Objective

- Develop modeling and simulation infrastructure for multi-disciplinary collaborative Engineering Design Environment.
- Develop mission and instrument design space exploration capability for valid requirement generation.
- Develop high-fidelity measurement simulation for iterative design validation.



Accomplishments

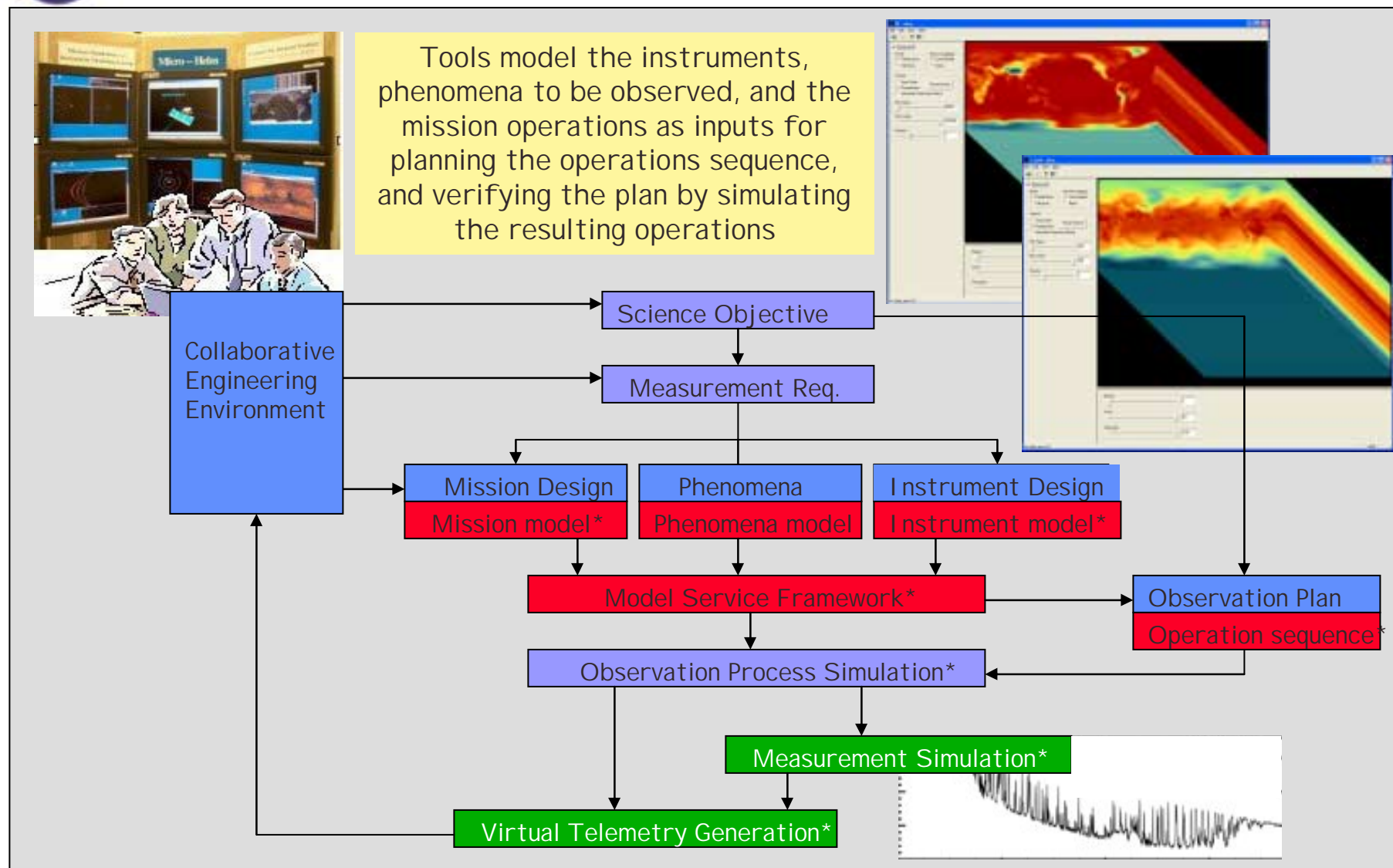
- Completed distributed discipline model integration framework and web-based model service protocols.
- Completed observation activity modeling and observation process simulation system.
- Completed telemetry data modeling and multi-channel telemetry visualization system.
- Significance
 - Provided advanced model-based project engineering infrastructure
 - Enabled real-time collaborative mission planning among multi-discipline teams
 - Enabled comprehensive science-return validation during pre-formulation phase
 - Technology has been infused to JPL's collaborative design centers

CoIs: Dr. Richard Weidner at JPL

TRL_{in} = 3; TRL_{out} = 7



DMS Process and Tools



* : DMS products



DMS Infusion

